

What is claimed is:

1. A pulse discharge apparatus comprising:

an electrical load;

5 an electrical power source; and

at least one pulse discharge switch module;

said at least one pulse discharge switch module including:

at least one capacitor for storing an electrical energy;

a semiconductor high-power switch having an input connected in series to said

10 at least one capacitor for allowing said stored electrical energy to be transferred from

said at least one capacitor to said load; and

a semiconductor low-power switch having an input connected in series to said

at least one capacitor for allowing charging supply from said electrical power source

charge said at least one capacitor;

15 wherein said high-power switch and said low-power switch are connected to the same

terminal of said at least one capacitor.

2. The pulse discharge apparatus as defined in claim 1, including a plurality of said

pulse discharge switch modules connected in parallel with one another.

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3. The pulse discharge apparatus as defined in claim 2, wherein said plurality of said pulse discharge switch modules are substantially identical to each other.

4. The pulse discharge apparatus as defined in claim 1, wherein said at least one pulse discharge switch module includes a plurality of said capacitors connected in series or in parallel with one another.

5 5. The pulse discharge apparatus as defined in claim 1, further including a module trigger selector provided for controlling said at least one pulse discharge switch module and operatively coupled thereto.

10 6. The pulse discharge apparatus as defined in claim 5, further including a human interface device provided for controlling said module trigger selector.

7. The pulse discharge apparatus as defined in claim 2, further including a module trigger selector operatively coupled to each of said plurality of said pulse discharge switch modules, said module trigger selector is provided for independently and selectively controlling each of said plurality of said pulse discharge switch modules in order to selectively operate a selected number of said plurality of said pulse discharge switch modules.

15 8. The pulse discharge apparatus as defined in claim 7, further including a human interface device provided for controlling said module trigger selector.

20 9. The pulse discharge apparatus as defined in claim 1, wherein said low-power switch of said at least one pulse discharge switch module includes a semiconductor-controlled rectifier.

10. The pulse discharge apparatus as defined in claim 1, wherein said high-power switch of said at least one pulse discharge switch module includes a semiconductor-controlled rectifier.

5        11. The pulse discharge apparatus as defined in claim 10, wherein said high-power switch of said at least one pulse discharge switch module further includes a diode connected in parallel to said semiconductor-controlled rectifier.

10        12. The pulse discharge apparatus as defined in claim 1, wherein said pulse discharge apparatus is a magnetic pulse welding machine.

13. The pulse discharge apparatus as defined in claim 12, wherein said electrical load is an inductive coil of said magnetic pulse welding machine.

15        14. The pulse discharge apparatus as defined in claim 1, wherein said electrical power source provides a charging current to said at least one capacitor.

15. A pulse discharge apparatus comprising:  
an electrical load;  
20        a D.C. electrical power source;  
a plurality of substantially identical pulse discharge switch modules connected in parallel with one another;  
each of said pulse discharge switch modules including:

a capacitor for storing an electrical energy;

5 a semiconductor high-power switch having an input connected in series to said capacitor for allowing said stored electrical energy to be transferred from said capacitor to said load, said high-power switch including a semiconductor-controlled rectifier and a diode connected in parallel to said semiconductor-controlled rectifier;

a semiconductor low-power switch having an input connected in series to said capacitor for allowing charging supply from said electrical power source charge said capacitor, said low-power switch including a semiconductor-controlled rectifier;

10 said high-power switch and said low-power switch are connected to the same terminal of said capacitor;

a module trigger selector electrically coupled to each of said plurality of said pulse discharge switch modules, said module trigger selector provided for independently and selectively controlling each of said plurality of said pulse discharge switch modules in order to selectively operate a selected number of said plurality of said pulse discharge switch

15 modules; and

a human interface device provided for controlling said module trigger selector.

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